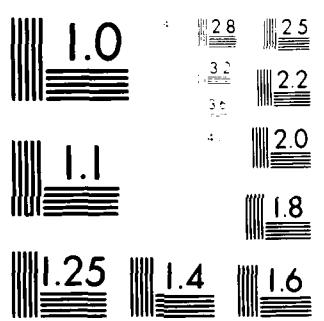


AD-A109 858 OFFICE OF NAVAL RESEARCH LONDON (ENGLAND) F/G 6/1
INTERNATIONAL BIODETERIORATION SYMPOSIUM (5TH), ABERDEEN, SCOTL--ETC(U)
DEC 81 E C HADERLIE
UNCLASSIFIED ONRL-C-13-81

NL

1 OF
AD-A
109-858

END
DATE
FORMED
02 82
DTIC



MICROFILM RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS

AD A109858

LEVEL II

(12)

CNR LONDON CONFERENCE REPORT



C-13-81

OFFICE
OF NAVAL
RESEARCH

BRANCH
OFFICE
LONDON
ENGLAND

FIFTH INTERNATIONAL BIODETERIORATION SYMPOSIUM,
ABERDEEN, SCOTLAND, 7-11 SEPTEMBER 1981

E.C. Haderlie*

2 December 1981

* Naval Postgraduate School
Monterey, CA

OFFICIAL COPY

UNITED STATES OF AMERICA

APPROVED FOR PUBLIC RELEASE; DISTRIBUTION UNLIMITED.

OCT 20 1988

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

| REPORT DOCUMENTATION PAGE | | READ INSTRUCTIONS BEFORE COMPLETING FORM |
|---|---|--|
| 1. REPORT NUMBER C-13-81 | 2. GOVT ACCESSION NO. 1D-A109 858 | 3. RECIPIENT'S CATALOG NUMBER |
| 4. TITLE (and Subtitle) FIFTH INTERNATIONAL BIODETERIORATION SYMPOSIUM, ABERDEEN, SCOTLAND, 7-11 SEPTEMBER 1981 | 5. TYPE OF REPORT & PERIOD COVERED Conference | |
| 7. AUTHOR(s) E.C. Haderlie | 6. PERFORMING ORG. REPORT NUMBER C-13-81 | |
| 9. PERFORMING ORGANIZATION NAME AND ADDRESS | 10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS | |
| 11. CONTROLLING OFFICE NAME AND ADDRESS | 12. REPORT DATE 2 December 1981 | |
| 14. MONITORING AGENCY NAME & ADDRESS(if different from Controlling Office) | 13. NUMBER OF PAGES | |
| 16. DISTRIBUTION STATEMENT (of this Report) | 15. SECURITY CLASS. (of this report) | |
| 15a. DECLASSIFICATION/DOWNGRADING SCHEDULE | | |
| 17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report) | | |
| 18. SUPPLEMENTARY NOTES | | |
| 19. KEY WORDS (Continue on reverse side if necessary and identify by block number) biodegradation enzyme assay fungal degradation microbial transformation | | |
| 20. ABSTRACT (Continue on reverse side if necessary and identify by block number) The meeting covered most aspects of biodegradation ranging from the degradation of library materials to woods, metals, petroleum products, and wool. Biodegradation was defined as the degradation of materials as a result of the activities of living organisms. | | |

FIFTH INTERNATIONAL BIODETERIORATION SYMPOSIUM,
ABERDEEN, SCOTLAND, 7-11 SEPTEMBER 1981

During the period 7 to 11 September 1981, the Fifth International Biodeterioration Symposium was held at the University of Aberdeen in Scotland. Over 150 delegates and guests from 22 countries attended. The largest delegations were from Great Britain (87) and the United States (21), and about half the papers were presented by them. As is all too common in many international meetings, the USSR scheduled several scientists to give papers and some submitted abstracts, yet none attended the symposium. The only representative from eastern Europe was Prof. E. Strzelcyk of Poland, who gave an excellent paper and was conspicuous by reason of the large "Solidarity" badge he wore. A total of 105 papers were scheduled for presentation, but a few were cancelled at the last minute.

The symposium, held under the auspices of the Biodeterioration Society, was organized along lines similar to the four previous ones. The first was held at the University of Southampton, England, in 1968 (Haderlie: ONRL C-20-68); the second at Lunteren, The Netherlands, in 1971 (Haderlie: ONRL C-27-71); the third at Kingston, Rhode Island, in 1975; and the fourth in West Berlin, in 1978 (Haderlie: ONRL C-11-78). The purpose of each symposium was to bring together a worldwide group of workers interested in both broad and specialized aspects of biodeterioration. For purposes of the symposium, "biodeterioration" was defined as the degradation of materials as a result of the activities of living organisms, and the meeting covered most aspects of biodeterioration ranging from the degradation of library materials to woods, metals, petroleum products, and wool.

The facilities provided by the university were outstanding. The meetings were held in well-appointed lecture rooms in the modern College of Agriculture. Delegates were housed in the students' quarters in the halls of residence, for the university was not in session. This made possible long discussions and social exchanges during the evenings.

The organizing committee did a good job in making preparations for publication of the papers presented at the symposium. Abstracts of most papers were available at the beginning of the meetings. The Biodeterioration Information Centre, University of Aston, Birmingham, England, will be responsible for the final publication and Prof. T.A. Oxley of the center will be the editor. It is anticipated that the work will be completed within one year.

The cost and work involved in preparing and hosting a large international scientific meeting has increased to the point where few individuals or institutions are willing to take on the task. Therefore, at the end of the fifth symposium there was no announcement as to if, when, or where a sixth symposium might be held. A few tentative invitations were forthcoming, however, and the next symposium may be held in the United States in 4 years time.

C-13-81

Because the entire proceedings will be available soon, no attempt is made here to give abstracts of the papers. Instead, papers are listed in the appendix as they appeared in the final revised program. A few papers listed in the final program were not presented, and as the author of this report was able to attend only one of the two or three simultaneous special sessions, it is possible that a paper listed in the appendix was not, in fact, presented.

C-13-81

APPENDIX

FIFTH INTERNATIONAL BIODETERIORATION SYMPOSIUM PROGRAM

Monday 7 September

Session I: Biodeterioration of Wood and Wood-based Materials

Chairman: A.F. Bravery (UK)

J.C. Cary (UK): Colonization of wood joinery.

A.W. Baecker & B. King (UK): The role of Actinomycetes in the biodeterioration of wood.

E.F. Bains (UK): Water potential, wick action, and timber decay.

M.A. Line (Australia): A technique for enzyme assay.

B. King, A. Bruce, & G.M. Smith (UK): Studies of nitrogen economy during microbial decomposition of wood in the soil.

M.D. Hale & R.A. Eaton (UK): Soft rot decay of wood: the infection and cavity forming processes of *Phialophora hoffmannii*.

N.B. Green (UK): Extracellular and mycelial hydrolase fractions from *Polystictus versicolor*.

T. Haraguchi, M. Fukushima, S. Fukada, & N. Morohoshi (Japan): Degradation of milled wood lignin by enzyme preparation from a wood destroying fungus, *Stereum frustuloseum*.

O. Walchli & P. Raschle (Switzerland): The dry rot fungus—experiments on its causes and effects of its occurrence in Switzerland.

R. Smith & A.J. Cserjesi (Canada): Protection from biodeterioration of unseasoned Canadian softwood lumber during storage and shipment.

B. Henningsson, A. Kaarik, H. Lundstrom & T. Nilsson (Sweden): Current Swedish research on biodeterioration and preservation of wood.

Session II: Biodeterioration in the Marine Environment

Chairman: D.R. Houghton (UK)

R.R. Colwell (US): Ecological considerations of microbial bio-transformations in the natural environment.

| | |
|---------------|----------------------|
| Accession For | |
| NTIS | ORNL |
| DTIC TAB | X |
| Unannounced | |
| Justification | |
| By _____ | |
| Distribution | |
| Availability | |
| Dist | Avail. or Special |
| A | |

- D. Kirchman & R. Mitchell (US): A biochemical model for settlement of marine fouling invertebrates.
- B. Norkrans (Sweden): Microbial adhesion-biodegradation.
- J. Carson & D. Allsopp (UK): Composition of fouling bacterial films from submerged materials.
- E.C. Haderlie (US): Monitoring growth rates in wood and rock boring marine bivalves using radiographic techniques.
- B.C. Hughes (UK): Rapid determination of relative ATP levels in toxin treated unicellular algae.

Session III: General Papers on Biodeterioration

Chairman: G.J.L Griffin (UK)

N.J. Butler (UK): Pharmaceuticals and cosmetics—the biodeterioration scene since the first symposium.

B.J. McCarthy (UK): Biodeterioration in wool processing.

K.J. Seal & A. Allsopp (UK): Investigative biodeterioration.

Tuesday 8 September

Session I: Biodeterioration of Wood and Wood-based Materials (cont.)

M.E. Hedley (New Zealand): Practical considerations in assessing the importance of biodeterioration of board materials and its prevention.

M. Inoue (Japan): Development of new architectural interior board not susceptible to fungal growth.

D.J. Dickinson (UK): Recent developments in the control of the decay of timber.

J. Hansen (Denmark): Biocides from laboratory to practice.

M.A. Line (Australia): A direct technique for assessing the toxic diffusion of wood preservatives.

R.N. Smith & A.J. Ingleby (UK): Assessment of surface applied prophylactic fungicides in wood.

D. Rutherford (UK): Loss of pyrethroids from treated timber.

R.W. Berry (UK): Recent developments in the remedial treatment of wood boring insect infestations.

Session II: Biodegradation of Effluent Wastes

Chairman: D. Lieu (Canada)

T.H. Blackburn (Denmark): Methane production, ¹⁵N-nitrate reduction, and ¹⁵N-ammonia turnover in cattle wastes.

E.M. Davis, J.E. Turley, D.M. Casserly & R.K. Guthrie (US): Partitioning of selected organic pollutants in aquatic ecosystems.

Y.D. Hang (US): Rapid degradation of food industrial effluents by flocculent yeast.

R.E. Hodson, R. Benner & A.E. Maccubbin (US): Transformation and fate of natural and pollutionally derived lignocellulosic detritus in coastal marine environments.

H. Kadota, Y. Yoshida & K. Mitsuhashi (Japan): Microbial removal of nitrogen from effluent waste using intermittent aeration techniques.

Y.M. Kim & G.D. Hegeman (US): Carbon monoxide as a substrate for the growth of *Pseudomonas carboxydohydrogena*.

Session III: Biodeterioration in Museums, Galleries, Libraries and Archives

Chairman: A.D. Baynes-Cope (UK)

J. Lee (UK): Biodeterioration of ethnographic material from the field to the museum.

W.S. Robinson (UK): Microbial corrosion of ancient metals—implications for marine archeology.

K. Finch (UK): Biodeterioration of textiles accepted for conservation at the Textile Conservation Centre at Hampton Court Palace.

R.M. Organ (US): The need of museums for biocides.

A.S. Zainal, M.A. Ghannoum & A.K. Sallal (Kuwait): Microbial biodeterioration of leather and leather-based exhibits in Kuwait National Museum.

P. Raschle (Switzerland): Experience regarding the combat of

molds in the restoration of ceiling paintings in a Swiss baroque monastery church.

Session IV: Biodeterioration in the Marine Environment (cont.)

J.M. Johnston (UK): Biodeterioration of ferrous metal surfaces.

R.G.J. Edyvean & L.A. Terry (UK): The influence of micro-algae on corrosion of structural steels used in the North Sea.

J.A. Hardy & W.A. Hamilton (UK): Lithotrophic growth of North Sea sulfate-reducing bacteria on hydrogen.

H.R. Rosser & W.A. Hamilton (UK): Microbial fouling of metal surfaces in the marine environment: rates of colonization and surface deterioration.

T. Balasubramanian & V.K. Venugalan (India): Decomposition and release of DOM from plankton, seaweed and mangrove leaves.

Session V: Biodeterioration of cereals and agricultural products.

Chairman: B. Flannigan (UK)

R.D. Watson (UK): Down on the farm; biodeterioration of crop products in Scottish agriculture: its causes and effects.

J.H. Crawford (UK): Cellulase production by *Scopulariopsis brevicaulis* isolates obtained from broiler litter.

S.K. Ogundana & N. Onwubuya (Nigeria): Fungal deterioration of maize in Butler storage.

A. Misra, A. Kumar & S.K. Varma (India): Post harvest decay of fruits and vegetables in India.

P. Shirname, N. Dasai & H.S. Chhatpar (India): Biochemical aspects of biodeterioration of cigarettes.

L. Stevens & J.M. Relton (UK): Enzyme activities of the xerotolerant fungi *Aspergillus restrictus*, *A. candidus*, *A. halophilicus* and *A. amstelodami*.

Wednesday 9 September

Session I: Biodeterioration in Museums, Galleries, Libraries and Archives (cont.)

G.J. Olson, W.P. Iverson & F.E. Brinckman (US): Biodeterioration of standard reference materials (SRMs).

Session II: Biodeterioration by Birds, Insects and Higher Plants.

Chairman: T.A. Oxley (UK)

A.S. Waterhouse (UK): Higher plants as deteriogens on railways.

M.R. Martinez (Mexico): Deterioration and damage produced in corn grains in Mexico by *Phostephanus truncatus* (Horn) (Coleoptera: Bostrichidae).

J. R-E. de Conconi & J. Siqueiras (Mexico): Laser light as a potential method for pest control in preserved food.

Session III: Biodegradation of Effluent Wastes (cont.)

E.J. Kirsch, C.P.L. Grady, Jr., & R.F. Wukasch (US): Experimental strategy for evaluating the fate of priority pollutants in waste-water systems.

R.J. Larson, R.D. Vashon & L.M. Games (US): Biodegradation of trace concentrations of chemicals in freshwater and estuarine systems.

M. Firpi and C. Cervio (Italy): Anaerobic digestion of paper mill sludges, a potential sources of energy.

A. Maccubbin, R. Benner & R.E. Hodson (US): Interaction of pulp mill effluents with microbial populations in coastal waters and sediments.

R.M. Madden and P. Forget (France): Anaerobic digestion of paper mill effluent.

Thursday 10 September

Session I: Fate and Effect of Petroleum and Xenobiotics in the Environment.

Chairman: R.W. Traxler (US)

R.R. Colwell (US): Environmental fate of xenobiotics in deep ocean dumping.

H. Oujesky, W. Brooks & B. Herman (US): Microbial populations

of the Gulf of Mexico and the effects of south Louisiana crude oil on these populations.

W.C. Wyndham & J.W. Costerton (Canada): The microbial degradation of bitumen in a river draining the Athabasca tar sands.

J.J. Cooney & R.J. Smucker (US): Cytological and physiological responses of *Cladosporium resinae* exposed to hydrocarbon.

C. Gatellier & F. Bretand (France): Limiting factors in oil biodegradation in marine environments.

P.A. Cane, G.D. Floodgate & P.A. William (UK): Biodegradation of beached oil.

D.W.S. Westlake, F.D. Cook & P. Kershaw (Canada): Terrestrial biodegradation of oil north of latitude 60°.

R. Guthrie, D.S. Cherry, E.M. Davis, H.E. Murray, J.M. Walton & R.S. Harvey (US): Fate of chemical elements from coal ash correlated with pH of effluent water.

D.T. Gibson (US): Biodegradation of aromatic hydrocarbons.

R.W. Traxler, L.S. Battacharya, P. Griffin, P. Phlot, G. Garafalo, K. Kulkarni & M.S. Wilson (US): Microbial response to dispersed oil in marine ecosystems.

Session II: Control of Biodeterioration by Chemical Biocides, Biostats and Preservatives

Chairman: W. Paulus (Germany)

W. Paulus (Germany): Microbial phenolic compounds—critical examination.

H. Gattner & K. Wagner (Germany): Chemical control of microbial growth on paint films and plasters; and contribution to the current situation.

H. Augustin (Germany): Microbial cleaners—chemical, physical, toxicological, and eco-toxicological properties of amphoteric microbiocides.

B. Crouch (UK): Evaluation of biocides for application in North Sea oil operations.

M. Stanger-Johannessen, G. Eidsa & J.P. Loken (Norway): Loss of rot-proofing effect of organic copper compounds by action of *Aspergillus niger* and other fungi.

Session III: General Papers on Biodeterioration (cont.)

- M. Inoue (Japan): Study of fungal contamination of agricultural polyvinylchloride film in Japan.
- M.A. Channoum & A.S. Zainal (Kuwait): An approach to biodeterioration studies in the Arabian Gulf—Kuwait.
- R.N. Smith & L.M. Nadim (UK): Fungal growth on inert surfaces.
- G.P. Avari & D. Allsopp (UK): The combined effect of pH, solutes, and water activity on the growth of some xerophilic *Aspergillus* species.

Session IV: Biodeterioration of Cereals and Agricultural Products
(cont.) (cont.)

- G.C. Llewellyn & R.H. Johnson (US): Model for evaluating peanut deterioration due to mold-producing aflatoxins.
- A. Chesson, A.H. Gordon, & J.A. Lomax (UK): Cell wall organization and the biodegradation of cereal straws.
- J.E. Smith & J. Mackie (UK): Mycotoxins in animal feeds.

Friday 11 September

Session I: Biotransformation of Polymers

- Chairman: A.M. Kaplan (US)
- S.J. Huang (US): Effects of chemical structures and morphology on the biodegradation of hydrolyzable polymers.
- N.F. Hamilton (US): Biodeterioration of flexible PVC films by fungal organisms.
- R.A. Pathirana & K.J. Seal (UK): *Gliocladium roseum* (Link) Thom, a potential biodeteriogen of polyester polyurethane elastomers.
- A.C. Albertsson (Sweden): Biodegradative liberation of $^{14}\text{CO}_2$ from marked poly(tetramethyleneadipate) by *Aureobasidium pullulans*.
- R.C.W. Berkeley, A. Abbott, C. Browne & R. Campbell (UK): Deposition of bacteria onto chitin membranes *in vitro* and their colonization and biodegradation in a natural oligotrophic water.
- J.V. Hookey & M. Goodfellow (UK): Numbers, types and ecology of Nocardiace isolated from rubber in contact with potable water and sewage systems.

V. Brettschneider (Netherlands): Fungal isolations from buried biodegradable polyurethanes and the surrounding soil.

Session II: Biodeterioration of Petroleum and Petroleum-based Products

Chairman: E.C. Hill (UK)

E. Wycislik & D. Allsopp (UK): Heat control of microbial colonization of shipboard fuel systems.

R. Elsmore & E.C. Hill (UK): Pasteurization of lubricants and coolants.

J.M.M. Cebrian (Spain): Biodeterioration of bituminous materials.

W. Fass & G. Miller (Israel): Factors affecting the microbial contamination level of jet fuel.

R.N. Smith & B. Crook (UK): The growth and mortality of *Cladosporium resinae* in biocide-treated fuel oil.

G. Miller & R. Fass (Israel): Corrosiveness of jet and diesel fuels caused by sulfate reducing bacteria.

A.D. Smith, R. Hughes & B.J.B. Wood (UK): Stimulated oil biodegradation on railway tracks.

D.F. Gerson (Switzerland): Biochemical surfactants and interfacial free energies in the microbial utilization of insoluble substrates.

Session III: Biodegradation of Effluent Wastes (cont.)

M. Shariatpahni, A.C. Anderson, A. Abdelghani & A.J. Englands (US): Microbial metabolism of an organic arsenical herbicide.

Session IV: General Papers on Biodeterioration (cont.)

K. Tavardi & G.J.L. Griffin (UK): Attack by terrestrial crustacea on starch-extended polymers.

